

# Pro T-SQL 2005 Programmer's Guide



Michael Coles

## **Pro T-SQL 2005 Programmer's Guide**

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*For Devoné and Rebecca*

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# About the Author



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After his most recent tour of active duty military service, Michael landed in New Jersey and now works as a senior developer for Barnes & Noble in New York.

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# Introduction

**T**his book examines SQL Server 2005 T-SQL from a developer's perspective. It covers a wide range of developer-specific topics in SQL Server 2005, from an introduction to new developer tools such as SQLCMD and SQL Server Management Studio to new T-SQL functionality such as the `xml` data type, XQuery support, and T-SQL encryption.

I wrote this book as a practical and useful guide to help you make the most of SQL Server 2005 T-SQL. I provide a generous selection of sample T-SQL and, where appropriate, .NET code to demonstrate specific functionality.

## Who This Book Is For

This book is primarily for developers who want to take advantage of the new features in SQL Server 2005 T-SQL. The book assumes a basic knowledge of SQL—preferably a prior version of T-SQL—and builds on that foundation.

## How This Book Is Structured

This book is designed so that you can either read it cover to cover, or you can use it as a reference guide to quickly locate just the information you need on any particular topic. It is structured as follows:

### Chapter 1: The Role of T-SQL

This chapter provides a brief history of T-SQL and the ANSI SQL standards. It also provides some basic hints and tips for getting the most out of your T-SQL code and maintaining it over the long term. Those readers coming from a background in SQL Server 2000 T-SQL, who are well-versed in T-SQL programming best practices, might choose to skip this chapter.

## **Chapter 2: Tools of the Trade**

SQLCMD and SQL Server Management Studio (SSMS) are new tools designed to replace osql, Enterprise Manager, and Query Analyzer. The online help system and Adventure-Works sample database are also discussed. If you are just beginning to use SQLCMD or SSMS, this chapter provides a solid reference.

## **Chapter 3: T-SQL for SQL Server 2000 Programmers**

SQL Server 2005 provides several enhancements that SQL Server 2000 developers will be able to take advantage of immediately. This chapter covers new SQL Server 2005 data types, Common Table Expressions (CTEs), and new operators, keywords, and functions.

## **Chapter 4: Control-of-Flow and CASE Expressions**

SQL Server T-SQL has always had procedural extensions built right into it. This chapter covers ANSI SQL three-valued logic, T-SQL procedural control-of-flow statements, SQL CASE expressions, and CASE-derivative functions.

## **Chapter 5: User-Defined Functions**

This chapter discusses the three flavors of T-SQL user-defined functions: scalar user-defined functions, multistatement table-valued functions, and inline table-valued functions. Examples are provided, with tips on getting the most out of your own user-defined functions.

## **Chapter 6: Stored Procedures**

SQL Server provides stored procedures, which allow you to create server-side T-SQL modules. This chapter discusses creation and management of stored procedures, stored procedure parameters, recursion, and scope.

## **Chapter 7: Triggers**

SQL Server 2005 supports classic Data Manipulation Language (DML) triggers that perform actions when you insert, update, or delete rows in a table. Data Definition Language (DDL) triggers, which fire in response to DDL events, are new to SQL Server 2005 T-SQL. This chapter discusses both types of triggers.



## Chapter 8: T-SQL Encryption

SQL Server 2005 T-SQL includes a whole new set of statements to manage encryption keys and certificates, and a wide range of built-in functions to encrypt and decrypt data. This chapter explores the new T-SQL encryption key management and data encryption and decryption tools.

## Chapter 9: Error Handling and Debugging

This chapter discusses methods for handling errors in your T-SQL code, including legacy error handling and the new TRY...CATCH structured error-handling statements. Also discussed is the built-in Visual Studio T-SQL debugging tools.

## Chapter 10: Dynamic SQL

The risks (and how to avoid them) and rewards of dynamic SQL are discussed in this chapter. Client-side parameterization, SQL injection, and validation are also covered.

## Chapter 11: XML

This chapter begins with a discussion of the enhancements to legacy SQL Server XML functionality provided by SQL Server 2005. The chapter continues with an in-depth discussion of SQL Server's new XML functionality, including the new `xml` data type and its methods, XML schema collections, typed and untyped XML, XML indexes, and XSL Transformations.

## Chapter 12: XQuery and XPath

This chapter expands on the discussion of the enhanced XML functionality that began in Chapter 11 by providing an in-depth discussion of the XPath and XQuery capabilities provided by SQL Server 2005. The information and code samples presented in this chapter are designed to get you up and running with SQL Server 2005 XPath and XQuery quickly.

## Chapter 13: SQL Metadata

SQL Server 2005 provides more ways than ever to retrieve metadata about your server and database objects. This chapter covers SQL Server catalog views, compatibility views, ANSI-compatible INFORMATION\_SCHEMA views, and system stored procedures.

## Chapter 14: SQLCLR Programming

SQL Server 2005's Common Language Runtime integration offers new and exciting possibilities for expanding the power and functionality of your SQL Server–based applications. This chapter will show you how to create and register SQLCLR assemblies that allow access to .NET-based user-defined functions, stored procedures, user-defined aggregates, and user-defined types.

## Chapter 15: .NET Client Programming

The best database in the world is only as useful as its client-side application, and the .NET Framework provides several tools for client-side SQL Server connectivity. This chapter discusses ADO.NET, the `System.Data.SqlClient` namespace and the classes it exposes for querying data and executing T-SQL statements, and the `SqlBulkCopy` class.

## Chapter 16: HTTP Endpoints

SQL Server's new HTTP endpoints allow you to expose stored procedures and user-defined functions as web methods. The new HTTP endpoints feature tight integration with the SQL Server security model, easy setup and configuration, and greater efficiency than other methods of exposing SQL Server procedures as web methods.

## Prerequisites

At the time of writing, SQL Server 2005 Service Pack 1 was the latest production release. All of the code samples in the book were developed on SQL Server 2005 Service Pack 1. Because of changes to the SQL Server engine and to T-SQL in general, I cannot guarantee compatibility with previous SQL Server 2005 releases, such as the CTP releases.

Most of the code samples were designed to be run against the AdventureWorks sample database. If you do not have AdventureWorks, I highly recommend that you download it from <http://www.microsoft.com/sql>.

Many of the code samples will run properly on SQL Server 2005 Express Edition, but some will not due to differences in the available features. For example, SQL Server 2005 Express Edition does not support HTTP endpoints. For complete compatibility, use SQL Server 2005 Standard Edition or better.

Finally, a lot of the code samples in Chapters 14, 15, and 16 are written in VB and C#. These samples require the Microsoft .NET Framework 2.0 to run. If you want to compile and tinker with the code samples, I highly recommend you use Microsoft Visual Studio 2005 for the best overall experience.

## Source Code

As you read through the book, you may choose to type in some of the code samples by hand because it provides more familiarity with the techniques and styles used. Or you might want to compile, install, execute, modify, or study the code without entering it manually. Either way, I highly recommend downloading the source and just generally playing with it as you read the book.

All of the code is available in the Source Code/Download section of the Apress website at <http://www.apress.com>.

## Errata

Apress and the author have made every effort to ensure that there are no errors in the text or the code for this book. However, to err is human, and as such we recognize the need to keep you informed of any mistakes as they're discovered and corrected. An errata sheet will be made available on this book's main page at <http://www.apress.com>. If you find an error that hasn't already been reported, please let us know.

The Apress website acts as a focus for other information and support, including the code from all Apress books, sample chapters, previews of forthcoming titles, and articles on related topics.

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